



# University of Hawai'i at Mānoa

## Environmental Center

A Unit of Water Resources Research Center  
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822  
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

March 17, 1994  
RP:0156

Mr. Michael Lee  
District Engineer (PODCO-O)  
U.S. Army Corps of Engineers  
Building 320  
Fort Shafter, Hawaii 96858

Dear Mr. Lee:

Department of the Army Permit PODCO 93-013  
Honouliwai Fishtrap  
Honouliwai Ahupua'a, Moloka'i

The Honouliwai fishtrap is one of two aquaculture facilities which the State proposes to restore as demonstration projects. The objective of restoring the two aquaculture facilities is to revitalize the community and ohana-based traditional operation and management skills once associated with ancient Hawaiian fishponds and fishtraps. The purpose of the proposed project is to repair and reconstruct Honouliwai Fishtrap to restore it to working condition. Tsunamis, storm waves and the lack of maintenance have contributed to structural damage to the fishtrap walls. If issued, the Department of the Army Permit would also authorize periodic and post construction maintenance of the fishtrap.

We have reviewed the PODCO with the assistance of Franciscus Gerritsen, Ocean Engineering; Charles Fletcher, Hawaii Institute of Geophysics; Yoshitsugi Hokama, Pathology; and Heather Keevill of the Environmental Center.

### Pond Walls

The term fishpond is generic in referring to ponds developed by the Hawaiians as a method of food production. Fish traps are a subset of fish ponds, and a more specific definition applies to them. Fish traps appear only on the islands of Moloka'i and Lana'i and were designed to trap fish by constructing the wall so that it was submerged during high tide and remained above water at low tide. This definition conflicts with the plans outlined on page 1 of the PODCO which state that the "heights will range from five to six feet." Since

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the pond is only two to three feet deep, a wall height of five to six feet will be too high to be submerged at high tide.

Fish traps traditionally consisted of many lanes leading into or out of the trap. Page 1 of the PODCO states that one wall opening will be reconstructed. Reconstruction of only one wall opening for Honouliwai fishtrap would be inconsistent with the historical construction. In addition, one opening in the wall would limit the permeability of the wall and increase the erosion at the base of the cliff beneath a private residence. More lanes would increase the circulation in the pond, the permeability of the wall and be historically accurate. In order to properly evaluate the impacts of restoration, the number and location of lanes should be identified.

Another issue with regard to wall construction is the height and angle of the wall. Kikuchi noted that "the slope of the seaward wall appeared to be greater than that of the inner face. The purpose of the slope was to withstand wave energy." While the dimensions of the wall provided in the PODCO do not mention the slope, that aspect of construction is important in reducing wave reflection from the surface of the wall and subsequent scour at the toe, as well as maintaining the historic significance of the pond.

#### Use of Equipment

On page 2, a reference is made to the use of "heavy equipment." We are aware of activities at other fish ponds on Molokai where the coastal area was heavily impacted by use of heavy equipment. A more thorough discussion should be provided including a list of the types of heavy equipment that may be used, and an explanation of how the equipment can facilitate the restoration process without jeopardizing the adjacent reef areas.

#### Water Quality

Water quality is important for a fishpond, not only to comply with Department of Health water quality requirements, but also so that the fish produced within the pond are healthy. The main threats to water quality are siltation and turbidity. While page 2 of the PODCO states that reconstruction of the wall will temporarily increase turbidity, there is no mention of the source of the sediment or how it will be removed from the pond. Information should be included on the extent of erosion up stream from Honouliwai and mitigation suggestions should be provided if erosion is significant. In addition, the mechanism for the removal of sediment should be discussed and a prearranged deposit site identified.

Another issue related to water quality is the potential presence of cigua toxins in the area that can cause ciguatera poisoning in humans. Ciguatera poisoning is caused by eating fish that have accumulated cigua toxins. The illness may last for one day, or for years, depending on the dose and the reaction. If cigua toxins are present in an area, disturbance

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of the ocean environment may increase the bloom of the toxin carrying dinoflagellates and therefore the occurrence of ciguatera. Ideally, a study to determine the presence of cigua toxins should be done before and after restoration. However, the cost of this process may be prohibitive, so alternative solutions may be in order. Given that future pond restoration projects may come from *ohana* groups, it may be possible to experiment with methods for removing cigua toxins if they are present in a restored pond. We understand that research is being conducted at the University of Hawaii on methods of eradicating dinoflagellates that carry the cigua toxin from specific areas.

The issue of ciguatera is extremely relevant in the context of fishpond restoration. If *ohana* groups and/or government agencies put forth the effort to restore a pond, they should be aware of the potential for cigua toxins to render their fish inedible. Since the goal of fishpond restoration is to revive the Hawaiian cultural and historic value of subsistence agriculture, the presence of cigua toxins would not be desirable. The potential impacts of cigua toxins should be addressed, and mitigation measures should be outlined.

### Conclusions

Honouliwai and Kahinapohaku are demonstration ponds. They will set a precedent for the review, analysis, and consideration of environmental impacts and compliance with government regulations of subsequent ponds. Policies and procedures for dealing with common issues such as access, silt removal, or management of vegetation should be addressed, and mechanisms for dealing with those issues as they arise should be included in the PODCO.

At such time as Honouliwai or other fishponds are approved for restoration, we strongly urge that environmental conditions pertinent to the individual pond and its coastal area be diligently monitored. This should include a set of beach profiles to provide information on any changes in erosion and sediment transport, as well as tests for cigua toxins. In addition, more information is needed on the type of heavy equipment to be used, the mechanism for silt removal, and the number and location of the *makaha*.

Sincerely,

  
Jacquelin N. Miller  
Associate Environmental Coordinator

cc: OEQC  
Roger Fujioka  
Franciscus Gerritsen  
Charles Fletcher  
Yoshitsugi Hokama  
Heather Keevill